on the subsequent changes occurring in the appendix itself have chiefly to do with the repair of the damage done during the earlier periods of the attack.

3. The diffuse inflammatory process involving the walls of the appendix is of such character that even without gross evidences of perforation the protection of the general peritoneal cavity from infection depends upon the maintainance of the integrity of the fibrinous periappendicular adhesions rather than upon the bacterial impermeability of the walls of the appendix itself.

4. My observations lead me to agree with Deaver, Moynihan, Ochsner and others when they state that clinical perforation would almost never occur if the general practitioner and the laity would appreciate the fact that in appendicitis "perforation spells purgation" and withhold cathartics during the early stages of suspected cases.

5. If in cases of diffuse peritonitis the peritoneal surfaces are put at rest by withholding food and cathartics by mouth the sequence of subsequent changes occurring in the involved area represents a definite and essentially uniform process tending to the resolution of the lesion or the formation of definitely circumscribed abscesses.

6. After the first thirty-six to forty-eight hours of a diffuse peritoneal infection the lesions encountered are of such a character as to be essentially undrainable and not well suited to surgical interference, a condition which continues until the period of localized abscess formation.

TUBERCULOSIS OF THE VULVA.

By Kenneth Bulkley, M.D.,
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Since Koch,[59] in 1882, published his paper, there has grown up an enormous literature on the subject of tuberculosis. Among this can be found in nearly every language excellent and complete descriptions of the disease in its various forms. But although the process in the more common locations has been frequently described, some of the rarer manifestations have received but meager attention. It is the object of this paper to report a new case of tuberculosis of the vulva and to collate the scattered literature on the subject.

The following case has recently come under my observation. Mrs. G. M., aged forty-one years, was first seen in October, 1913. Her history at that time was as follows: Married, husband suffering from pulmonary tuberculosis, but as far as could be ascertained had no genital lesions. One normal delivery with healthy child twenty-two years previously. About seven years ago patient miscarried at five months. Five years ago she first noted a small raw area on the inner surface of the labia minora. This lesion has been progressive since that time. It has given no discomfort other than occasional moderate burning, but coitus has been painful. It has discharged moderately but persistently. There has been absolutely no history of hypertrophy. During the past five years a large number of non-operative attempts at healing have been made, without effect. Her genital history is otherwise negative. Menstruation regular, painless, and normal. In 1911 patient developed a pulmonary tuberculosis, for which she was treated in a sanitorium and finally discharged as cured. For the past year she has had no symptoms referable to the lungs.

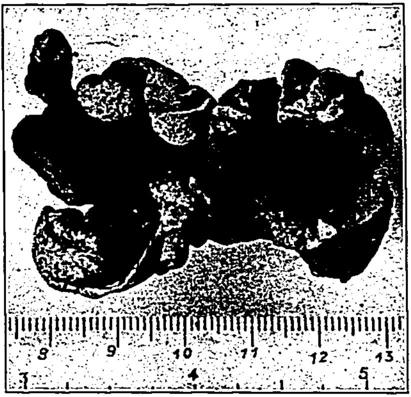

Fig. 1.—Excised specimen from author's case. Scale reads in centimeters and inches. View looking at ulcer surface. On the right the deep excavation anterior to the rectum; to the left the more shallow ulcer extending up the anterior vaginal wall. Between the two a narrower ulcer surface.

Physical examination when first seen was as follows: A rather small-framed, wiry, thin woman, not anemic, and apparently in good general condition. Repeated examination of the chest failed to elicit any signs of active tuberculosis, nothing but relative dulness and some increased voice and fremitus remaining at both apices as evidence of her previous trouble. No enlargement of inguinal or other superficial lymph nodes. Abdomen and extremities apparently normal. Wassermann reaction negative.

Local examination disclosed the following: Uterus readily felt, retroflexed but freely movable without pain, fornices clear, no tenderness, no masses. Cervix shows old bilateral tear but is otherwise normal. Vaginal mucosa without lesion. Rectal examination negative, no stricture, fistula, or abscess. The left labia minora is replaced by an ulcer, the general shape of which is that of a dumb-bell, its long axis extending anteroposteriorly. It encroaches to a slight extent on the lateral vaginal wall above and on the inner surface of the labia majora below. Anteriorly its superficial diameter increases and reaches the vestibule and the edge of the urethra. Here it dips sharply upward along the anterior vaginal wall and parallel to the urethra to the depth of an inch. Posteriorly it shows a similar extension beneath the posterior vaginal and anterior rectal walls. There is no hypertrophy and no induration about the ulcer base or edge. The latter is a little irregular, well defined, rather poorly nourished, precipitous, and not undermined. The base of the ulcer is formed of irregularly disposed granulation tissue, grayish, edematous, not readily bleeding, not sensitive. Its surface is covered with a slimy mucus admixed with a moderate amount of pus.

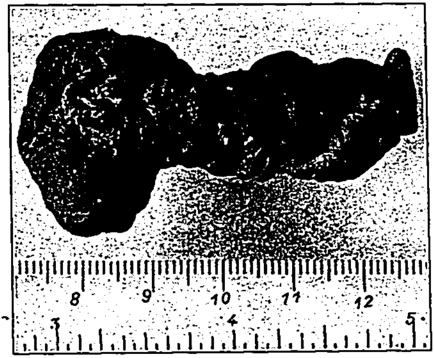

FIG. 2.—Excised specimen from author's case. Scale reads in centimeters and inches. Lateral view showing the general dumb-bell shape of the lesion (somewhat distorted in fixation).

In view of the tuberculous history, the duration of the lesion, the absence of anything suggestive of epithelioma, and the negative Wassermann reaction the case was considered as a tuberculous ulcer and excision advised. Under gas and ether anesthesia this was done on October 24, 1913. The entire labium majus, the region of the labium minor, and a portion of the left lateral vaginal wall were excised *en masse*, together with the extensions along the urethra and rectum. Both these latter structures were preserved and the wound repaired by a modified perineorrhaphy. The immediate convalescence was smooth and, except for a small hematoma at the posterior portion of the wound, due to insufficient hemostasis at time of operation, the healing was by primary union.

A month later examination showed a small recurrence in the form of an ulcer at the urethral edge in the line of suture. As this lesion improved with the application of 10 per cent. silver nitrate, and as the patient gained twenty pounds in the two months following operation, it received no further treatment until February 24, 1914, four months after the initial operation. It was then thoroughly cauterized with the Paquelin cautery, and in two days the patient returned to her home out of the city.

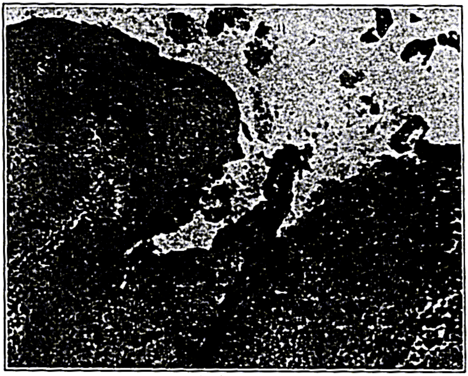

FIG. 3 (× 175).—Author's case. Low-power photograph showing the slightly overhanging epithelium at the ulcer edge and the general character of the ulcer base.

Unfortunately the patient was not seen after this date. According to her own statements and those of her husband the area cauterized became smaller and was apparently in process of healing until the time of death. About two weeks after cauterization the patient began to run an irregularly intermittent and finally a continuous temperature. No definite physical signs to account for this temperature could be found by several physicians who examined her, but the prevailing opinion was that death, which occurred on April 8, 1914, was due to an acute general miliary tuberculosis. No autopsy was made. Locally healing continued until time of death.

Microscopic section shows an ulcer whose base is formed of granulation tissue everywhere infiltrated with small round cells and polymorphonuclear leukocytes. In the deep subcutaneous tissue beneath the ulcer base and also beneath the overlying epithelial edges surrounding the ulcer are found typical miliary tubercles. In the centres of the majority of these are collections of multinuclear giant cells whose nuclei are arranged peripherally. About the ulcer margin some of these tubercles are found nearly reaching the deep layers of the epithelium. This latter is of normal thickness, and in some areas slightly cornified. There is a great increase in the number and size of the bloodvessels of the subcutaneous and submucous tissue about the ulcer edge. No tubercle bacilli can

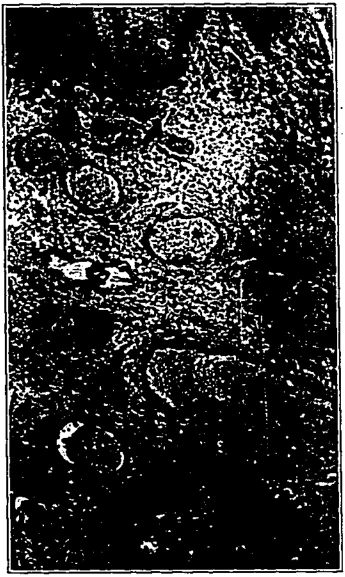

FIG. 4 (× 100).—Author's case. Section taken a short distance from ulcer edge to show the great vascularity. To the left can be seen the deeper layers of the epithelium. Note the dilated and engorged bloodvessels and the beginning round-celled infiltration in the deeper layers of the section.

be anywhere found. This is probably due to the fact that the specimen has been preserved for six months in alcohol.

HISTORICAL NOTE. Tuberculosis of the female genitalia was practically unknown until Morgagni,[75] in 1771, discovered at autopsy and described a case of tuberculosis of the tubes and uterus. This finding created at the time but little comment, for although there are scattered through the literature of the following years occasional references to the subject, no further contribution of note appears until a description by Raynaud,[84] in 1831, of a case of pulmonary tuberculosis in which there was an associated tuberculosis of the uterus, tubes, and vagina. This is the first vaginal case reported. In 1849 Huguier[52] coined the unprecise term "esthiomene," and suggested that some of the cases might be due to tuberculosis. Interest in the subject increased rapidly from that date and numerous important and interesting observations were made. Bernutz,[7] in 1874, and Martineau,[71] in 1883, each reported cases of esthiomene, supposedly tuberculous. In the same year Babes[2] found tubercle bacilli in the vaginal secretion, and in the following year Mandach[67] reported the operative removal of tuberculous tubes and ovaries. It remained for Hegar,[50] in 1886, to thoroughly popu-

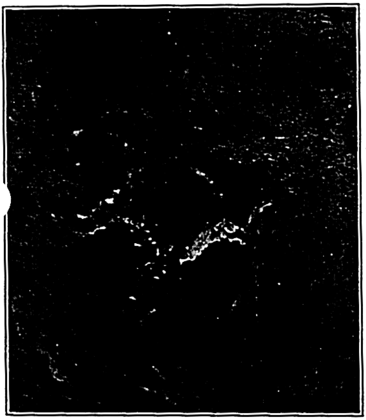

FIG. 5 (× 300).—Author's case. Section taken through the centre of a tubercle situated deeply in the connective tissue beneath the mucosa, to show the character of the giant cells.

larize the subject clinically among the profession. Among the more recent articles in English dealing with the general subject of female genital tuberculosis should be mentioned the papers of Williams,[108] Senn,[93] and Murphy.[77]

Tuberculosis of the vulva as such has received far less attention. The first undoubted cases were reported independently, in 1881, by Cayla[13] and by Winckel,[109] although the cases of Bernutz,[7] in 1873, Cornil and Rigal,[18] in 1879, and others should, without question, be included in this class. Since 1881 many cases have been reported and not a few notable monographs placed on record. Among these should be especially mentioned articles by Bonnin,[9] in 1904, Bender,[4] in 1906, Combeléran,[17] in 1906, Daniel and Jianu,[21] in 1907, Stoica,[100] in 1907, Forgue and Massabuau,[36] in 1909, and Daniel,[20] in 1913.

FREQUENCY. While statistics on the frequency of genital tuberculosis in women are readily obtainable, we have been unable to find any definite statistics relative to the frequency of involvement of the vulva in the tuberculous process. Its rarity is apparent not only from the fact that since 1881 only 71 cases have been reported, but also from the following statistics:

Geil[42] in 45 cases of tuberculosis of the uterus found no cases involving the vulva.

Mosler[76] in 47 cases of female genital tuberculosis found no cases involving the vulva.

Daurios[23] in 166 cases of female genital tuberculosis found no cases involving the vulva.

Beyea[8] collected 69 cases of cervical tuberculosis and found no cases involving the vulva.

Berkeley[6] among 8000 autopsies found genital tuberculosis 62 times and no cases involving the vulva.

Schiler[90] in 68 cases of genital tuberculosis found no cases involving the vulva.

Martin[70] in 53 cases of genital tuberculosis found no cases involving the vulva.

Simmonds[95] among 600 autopsies found genital tuberculosis 80 times and no cases involving the vulva.

Schlimpert[91] in 3514 autopsies found genital tuberculosis 73 times and no cases involving the vulva.

It is thus impossible to say in what percentage of cases of pulmonary, general miliary, or genital tuberculosis a localization in the vulva can be expected. Considering the fact that tuberculosis of the genitals is found in about 2 per cent. of cases coming to autopsy, showing other lesions of tuberculosis, and recalling the above figures, we must admit that the possibilty of vulva involvement is exceedingly small. That it occurs in animals as well as humans is shown by the report of Joest,[55] who describes a case of primary tuberculosis of the vulva in a cow.

Age. Bonnin[9] calls attention to the relative frequency of tuberculosis of the vulva in children. Table I (compiled from 72 cases) not only sustains this view, but shows that the disease is more common during the years of greatest sexual activity. A study of this table brings out the following points: Over 12 per cent. of the total number of cases occur during the first five years of life and nearly 17 per cent. before the tenth year. After that age there is a rapid fall in incidence, and no cases have been reported between the ages of ten and fifteen. As sexual life develops we see the possiblity of involvement increasing to such an extent that between the ages of twenty-five and forty one-third of the cases are found. With the subsidence of sexual activity comes a decline in incidence, so that after the age of fifty-five cases are but rarely seen. The youngest case in this series was seven months and the oldest eighty-eight years.

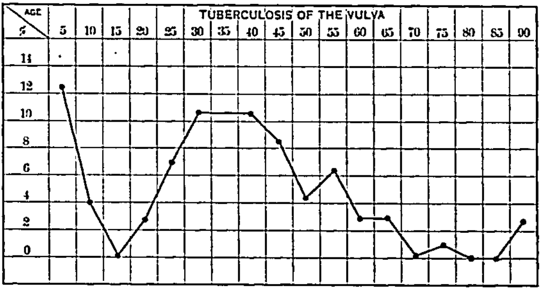

FIG. 6.—Table of age incidence compiled from sixty-two cases in the literature in which the age is given.

PATHOGENESIS. "As in all tuberculosis the bacillus of Koch is the condition *sine qua non* of the lesion." For infection to occur there must be not only local but also general causes. These latter do not concern us here, as they are of the same nature as those partially responsible for the development of tuberculosis elsewhere in the economy.

The local causes are, however, of importance, for in an individual predisposed to tuberculosis or already harboring a tuberculous focus elsewhere in the body these causes must operate for the localization of the infection at the vulva, whether it be primary or secondary. They may be grouped as inflammatory and traumatic.

Trauma is probably a factor tending to a certain extent to favor the localization of the infection. Experimentally, Popoff[50] was unable to produce genital tuberculosis in pigs or in rabbits without traumatism. Gorowitz,[44] working independently, obtained similar results. In the 59 cases here reported above the age of fifteen years traumatism seems to have played some role. In 4 of these there was a definite history of injury either by a fall or by violent coitus; 23 cases are definitely stated to have had previous pregnancies, some of them going to full term, a number being instrumental, and a few terminating in abortion. In 32 cases the data is incomplete, but when we consider that these were all adults it is reasonable to suppose that some, at any rate, had borne children. It is worthy of notice that trauma is not mentioned in any of the 12 cases occurring before the age of ten years, but the source of infection can be reasonably traced in the majority of these children, and the trauma of handling and washing may have been sufficient not only for the *locus minoris resistensiæ*, but for the direct implantation of the bacilli. As Bonnin[9] says, "Traumatism, great or small, evident or unknown, appears after all as necessary for the development of tuberculous lesions in the region of the vulva."

Inflammation is also considered by some writers as playing a prominent role in the local predisposition to infection. Deschamps,[29] Jorfida,[56] and Combeléran[17] all lay emphasis on this, and point to acute simple vaginitis, gonorrheal vulvovaginitis, local manifestations of syphilis, simple ulceration, and excessive coitus as agents resulting in inflammatory processes predisposing to later tuberculous infection. In this connection it should be pointed out that a fair proportion of the cases in this series have been prostitutes.

Mode of Infection. The majority of authors in describing the mode of infection in vulvar tuberculosis have divided the cases into three groups, as follows: Primary vulvar tuberculosis, primary vulvar tuberculosis by auto-inoculation, and secondary vulvar tuberculosis. In the first group are placed those cases having no other focus of tuberculosis in the body. The second group comprises those cases in which the individual already harbors a tuberculous focus and infects herself by fingers, sputum, etc. The third group includes cases found in tuberculous subjects in which the vulva is infected by transmission of the bacillus within the body. This classification has seemed to us unnecessary. We will retain the first group as correct. The two following groups we will include under the heading of "secondary vulvar tuberculosis."

Primary Vulvar Tuberculosis. This is the most uncommon of the three forms, but that it does and can occur is indubitably proved by reported cases and experimental work. Popoff[80] and Gorowitz[44] have each been able to produce tuberculosis of the vulvovaginal mucosa in pigs and rabbits by the local deposit of tubercle bacilli after suitable traumatism. Among 47 cases of female genital tuberculosis Mosler[76] found 9 cases (19.5 per cent.) which he considered as primary. Among 119 cases Spaeth[97] considered 27

TABLE I.—CHRONOLOGICAL TABLE OF REPORTED CASES OF TUBERCULOSIS OF THE VULVA.

No	Year.	Reporter.	Age.	Type.	Parts involved.	Trauma.	Associated tuberculous lesions.	Treatment.	Results.	Remarks.
1	1881	Cayla[13]	42	Ulcer with hypertrophy	Entire introitus	1 child	Advanced pulmonary tuberculosis	None	Died	Anus and vulva a "cloaca" at time of death. Child died of tuberculosis.
2	1881	Winckel[109]	28	Ulcer with hypertrophy	Both labia minora	Miscarriage	None found	None	Died	Autopsy case.
3	1881	Winckel[109]	20	Ulcer with hypertrophy	One labia majora and minora	?	Tuberculous inguinal adenitis	None	Died	Autopsy case.
4	1884	MacDonald[64]	40	Ulcer	Entire vulva and perineum	Children	None found	None	Died after 2½ years	Lupus type.
5	1884	MacDonald[64]	33	Ulcer with hypertrophy	Right labia majora and minora	Injury by fall 2 years previous	None found	Curette and cautery	Well 1 year later	One child.
6	1884	MacDonald[64]	40	Ulcer with hypertrophy	Both labia majora	8 children	None found	Curette and cautery	"Cured;" end result ?	
7	1885	Deschamps[29]	25	Ulcer with hypertrophy	Labia minora and posterior commissure	Injury by fall 4 months previous	Advanced pulmonary tuberculosis and lupus of face and hand	Palliative	Died in 3 months	Prostitute. Autopsy showed other genitals normal.
8	?	DeFontaine[25]	40	Fistula	Labia majora	?	Tuberculous wrist and lungs	Cautery	Healed in 6 months	Fistula also communicating with rectum.
9	1886	Chiari[16]	30	Ulcer with hypertrophy	Clitoris, labia majora and minora	Injured during coitus 2 years previous	Tuberculous ulcers rectum. Autopsy showed general tuberculosis	None	Died	Autopsy case
10	1887	Demme[24]	13 mos.	Ulcer with hypertrophy	Labia minora	None	Tuberculous inguinal adenitis; tuberculous meningitis	Curette and cautery	Healed locally	Mother had pulmonary tuberculosis. Child died at 10 months of tuberculous meningitis.
11	1887	Demme[24]	7 mos.	Ulcer	Vulva	None	?	Curette and AgNO. No healing Healed after HNO	Well 2 years later	Father tuberculous.
12	1887	Demme[24]	15 mos.	Ulcer	Vulva	None	Tuberculous inguinal adenitis; pulmonary tuberculosis	None	Died	
13	1888	Zweigbaum[113]	32	Ulcer	Both labia minora and majora	?	Tuberculous lungs, vagina, and cervix; tuberculous rectovaginal fistula	Local	Died	Primary in cervix, then vagina infected, and then vulva.
14	1889	Weinlechner[107]	38	Ulcer	Entire side of introitus	3 children	None found	Cautery excision	Recurrence in 18 months; end result not given	Tuberculous ulcer developing on luetic base.
15	1890	Haeberlin[44]	27	Ulcer with hypertrophy	Both labia, majora, and minora and clitoris	1 child	None found	Excision	?	Father died of tuberculosis.

16	1891	Viatte[108]	32	Ulcer with hypertrophy	Left labia, majora, and minora	Married	None found	2 excisions; tuberculin	Cured	Recurrence after each incision; finally healed with Koch's tuberculin: lupus type.
17	1894	Emanuel[22]	?	Ulcer with hypertrophy	Posterior fourchette	No children	Tuberculous cervix and vagina	Hysterectomy	Died	Operative death following panhysterectomy. Autopsy showed generalized miliary tuberculosis. Vulva secondary to cervix.
18	1895	Martin[66]	23	Ulcer with hypertrophy	Left labia minora	?	Tuberculous lungs and rectum and rectovaginal fistula	None	Died	Vulva and rectum a veritable cloaca at time of death.
19	1895	Montgomery[74]	30	Ulcer with hypertrophy	Both labia majora	4 children	None found	None at time of report	?	Case demonstrated. Advised treatment with iodoform in collodion.
20	1896	Hintze[41]	?	Ulcer	Mons veneris, both labia and perineum	3 children	None found	Excision	?	Possibly a primary case.
21	1896	Kuttner[41]	6	Ulcer with hypertrophy	Right labia majora; mons veneris	?	Tuberculous lungs and inguinal glands	Excision	Well in 3 months	End result not given.
22	1896	Schenk[99]	4½	Ulcer	Both labia minora, clitoris and urethra	?	Tuberculous inguinal adenitis	Excision	Recovery; end result unknown	Possible primary case. Infection from tuberculous playmates by fingers.
23	1897	Karajan[17]	2	Ulcer with hypertrophy	Clitoris and labia majora	?	Secondary tuberculous ulcer of vagina	Excision	Recurrence	Possible primary case. No sign of tuberculosis elsewhere in body. Vaginal ulcer developed as recurrence after first operation.
24	1898	Havas[49]	21	Ulcer	Entire vaginal orifice	?	Pulmonary tuberculosis	?	?	Pathologic specimen. Practically no data given.
25	1899	Winter[110]	?	Ulcer	Labia minora	?	?	?	?	
26	1899	Brosin[13]	Old	Ulcer	Vulva	?	?	?	?	
27	1899	Davidsohn[24]	?	Ulcer	Vulva	Following severe labor	Generalized miliary tuberculosis	None	Died	Autopsy case; also tuberculous vagina.
28	1899	Fiocco and Levi[34]	52	Ulcer with hypertrophy	Vulva	?	?	Curette and cautery	Rapid healing	End result not given.
29	1899	Gebhard[41]	?	Ulcer with hypertrophy	Urethral edge	?	?	?	?	
30	1899	Gebhard[41]	?	Ulcer	Labia minora	?	?	?	?	
31	1899	Hansen[47]	4	Miliary tubercles	Vulva	?	Tuberculosis of kidneys, tubes, uterus, vagina.	None	Died	Autopsy case; supposedly primarily renal and involving other structures secondarily.
32	1899	Rieck[87]	39	Ulcer with hypertrophy	Labia minora	Married; children	None found	Excision	Cured	Husband had pulmonary tuberculosis; possible primary case.
33	1901	Ehrmann[30]	32	Ulcer	Urethral orifice	Prostitute	Pulmonary tuberculosis	Iodoform	Healed in 6 months	Prostitute.
34	1901	Ehrmann[30]	50	Ulcer	Labia majora and posterior commissure	?	?	Iodoform	?	Old case of syphilis.
35	1901	Ehrmann[30]	56	Ulcer with hypertrophy	Labia majora and posterior commissure	?	No sign of pulmonary tuberculosis	Excision		

TABLE I.—CHRONOLOGICAL TABLE OF REPORTED CASES OF TUBERCULOSIS OF THE VULVA—(Continued).

No	Year.	Reporter.	Age.	Type.	Parts involved.	Trauma.	Associated tuberculous lesions.	Treatment.	Results.	Remarks.
36	1901	Jorfida[14]	23	Ulcer with hypertrophy	Labia majora and posterior commissure	After delivery	Tuberculous vaginal ulcers; tuberculous inguinal adenitis	Excision	Cured	Supposedly infected by tuberculous friend.
37	1901	Martin[49]	32	Ulcer with hypertrophy	Labia majora	3 children	Pulmonary tuberculosis	Excised	"Primary cure"	End result not given; two sisters had tuberculosis.
38	1901	Rechenbach[55]	33	Ulcer with hypertrophy	Labia minora, clitoris, edge of urethra	4 children	No sign of tuberculosis elsewhere	Cautery and curette	?	
39	?	DePaoli[27]	?	Ulcer with hypertrophy	Both labia	?	?	?	?	
40	?	DePaoli[27]	?	Ulcer with hypertrophy	Both labia		Tuberculous intestine and peritonitis	?	?	
41	1902	Poeverlein[29]	49	Hypertrophy only	Labia majora	1 child	?	Excision	Recurrence in 4 weeks	End result not given. Diagnosis before operation "sarcoma."
42	1903	Petit and Bender[75]	33	Hypertrophy only	Both labia majora	Forceps delivery	No sign of tuberculosis elsewhere	Excision	Recurrence in 2 months	End result not given.
43	1904	Bender and Nandrot[4]	30	Ulcer with hypertrophy and fistula	Both labia majora	Local injury from fall	No sign of tuberculosis elsewhere	Excision and cautery	Remained cured	
44	1904	Chiarabba[6]	?	Ulcer with hypertrophy	Labia majora and minora	?	Tuberculous peritoneum, uterus, tubes, and cervix	?	?	
45	1904	Frattali[28]	10	Ulcer	Labia majora	?	Tuberculous inguinal adenitis; tuberculous ulcer vagina	?	?	Lupus type.
46	1904	Renaud[66]	4	Ulcer with hypertrophy	Left labia minora	None	No sign of tuberculosis elsewhere	Iodine and iodoform	Healed in 15 days	End result not given; supposedly a primary case of vulva infection.
47	1906	Audry and Combeléran[1]	1	Ulcer	Right labia minora	?	Tuberculous inguinal adenitis	Excision	?	Mother had pulmonary tuberculosis.
48	1906	Bender[4]	26	Hypertrophy only	Both labia minora	?	?	?	?	
49	1906	Combeléran[17]	50	Lupus	Right labia majora	?	None found	Excision	?	Lupus type.
50	1906	Dambrin and Clermont[19]	88	Abscess	Right vulva	?	Tuberculous osteitis of pubis	Incision	?	Secondary to tuberculosis of bone. Only case on record.
51	1906	Danlos, Pathaut and Gaston[22]	55	Ulcer with hypertrophy	Clitoris and labia minora	?	?	Excision	Recurrence in 6 months	End result not given.
52	1906	Hamburger[34]	3	Ulcer	Posterior commissure and labia minora	?	Tuberculous cervical and inguinal adenitis	Hygienic	Healed	Mother had pulmonary tuberculosis; sister died of tuberculous meningitis.
53	1906	Logothetopoulos[43]	75	Ulcer with hypertrophy	Urethral edge	No children	Pulmonary tuberculosis	Excision	Died	Operative death in 6 days.

54	1907	Daniel and Jianu[21]	45	Ulcer with hypertrophy	Both labia minora and clitoris	3 children	Tuberculous rectum	Excision	Healed	End result not given.
55	1907	Daniel and Jianu[21]	45	Ulcer with hypertrophy	Labia majora	?	No sign of tuberculosis elsewhere	Excision	Healed	End result not given.
56	1907	Meriel[22]	20	Hypertrophy only	Left labia minora	?	Pulmonary tuberculosis	Excision	Cured	Well locally 7 years later, but pulmonary condition slowly progressive.
57	1907	Meriel[22]	20	Ulcer	Labia minora	?	?	Excision	Healed	End result not given.
58	1907	Wolff[10]	51	Ulcer	Vulva	?	Pulmonary tuberculosis	Excision	?	End result not given.
59	1908	Boursier[19]	63	Hypertrophy only	Right labia majora	Children	Pulmonary tuberculosis	Excision	Healed	But, 2 years later, lesion of left labia minora.
60	1909	Forgue and Massabuau[36]	35	Hypertrophy only	Right labia majora	?	Tuberculous cervical and axillary adenitis; pulmonary tuberculosis	Excision	Recurrence	Recurrence in 10 months before death due to pulmonary tuberculosis.
61	1909	Kelly[45]	55	Ulcer	Anterior commissure	?	?	Excision	?	
62	1909	Lecène[44]	40	Bartholin's gland	Bartholin's gland	?	Possible tuberculous cervix	Excision	?	
63	1909	Lecène[44]	23	Ulcer and Bartholin's gland	Labia minora and Bartholin's gland	?	Pulmonary tuberculosis; tuberculous fistula in ano; tuberculous inguinal adenitis	Excision	Recovery	End result not given. Considered by author a blood infection.
64	1910	Kroemer[46]	44	Ulcer with hypertrophy	Vulva	5 children	?	Excision	?	
65	1910	Lagane[62]	6	Ulcer	Entire introitus	?	Pulmonary tuberculosis; tuberculous kidney and bladder	?	Died	Father had tuberculosis. Four brothers and sisters died of tuberculous meningitis. Case of probable secondary infection from kidney.
66	1910	Mauler[73]	37	Ulcers	Introitus		Tuberculous lungs, uterus, tubes, vagina, peritoneum, intestine, spleen	None	Died	Autopsy case.
67	1910	Mauler[73]	41	Ulcers	Introitus	?	Tuberculous lungs, multiple joints, intestine, kidney, suprarenal, uterus, tubes, vagina, spine	None	Died	Autopsy case. Introitus involved by direct extension from vagina.
68	1910	Stoeckel[79]	28	Ulcer	Anterior commissure	Married	Miliary tuberculous intestine	Excision and cautery	Recovery	End result not given.
69	1911	Rosch[80]	87	Ulcer	Anterior commissure	?	Tuberculous lungs, uterus, cervix	None	Died	Autopsy case. Urinary passages normal.
70	1912	Brault[11]	7	Ulcer	Clitoris, labia majora and minora	?	No sign of tuberculosis elsewhere	Excision	Died	Early attempts at healing with chemical and thermal caustics without avail.
71	1913	Daniel[20]	30	Hypertrophy only	Right vulva and prepuce of clitoris	Miscarriages	Tuberculous inguinal adenitis	Excision	Recovery	End result not given. Husband had pulmonary and genital tuberculosis.
72	1914	Bulkley	41	Ulcer	Labia majora and minora	1 child; 1 miscarriage	Pulmonary tuberculosis	Excision	Recurrence; died	Died 6 months after operation with signs of an acute general miliary tuberculosis.

(24.5 per cent.) as primary. Numerous modes of infection have been suggested. Among them can be mentioned coitus, masturbation, clothing, pessaries, douche tips, wash-cloths, baths, toilets, the presence of tubercle bacilli in wash water, and air infection. Senn[93] considered most of the cases of all types infected by tuberculous sputum. Probably in the majority of cases, certainly of primary vulvar tuberculosis, infection occurs either by sputum or coitus. While it may be admitted that in any given case it is well-nigh impossible to point out with certainty the mode of infection, yet in a certain number of the cases in this series it seems fairly evident. We shall make no attempt to divide our cases into the two classes which we are now describing because of the manifest difficulty of doing so with any degree of accuracy. Nothing short of a complete postmortem on every case could make such a classification reasonably accurate. A few can be pointed out as examples of the probable mode of infection. In the two following cases the bacilli were probably derived from sputum. Schenk[89] describes a case involving the labia minora, clitoris, and urethra in a child four and one-half years old. This patient showed no other signs of tuberculosis, and repeated examinations of the chest were normal. It was later discovered that this child had a playmate with pulmonary tuberculosis, and the supposition is that the vulva was infected from tuberculous sputum probably transmitted by the fingers. Audry and Combeléran[1] describe a child of one year showing no other lesion of tuberculosis, who was probably infected from the soiled linen of the mother, who was tuberculous.

Much experimental and clinical evidence has accumulated in favor of the view that tuberculosis, local or generalized, can be transmitted from the male by coitus even in the absence of male genital tuberculosis. But here as before the local or general predisposition to infection plays its part, for when we consider the large number of cases of tuberculosis of the epididymis and prostate in married men, and the fact that very few of the wives of these men develop a tuberculous vulva, it at once becomes evident that coitus cannot always be incriminated. Some writers from this fact have argued that tuberculosis of the vulva is usually a descending infection, but Murphy suggests that the semen is usually transmitted beyond the vulva, into the vagina, and so the former escapes. Cohnheim,[14] in 1879, first suggested that genital tuberculosis might be transmitted by coitus. Corroborating this, Fernet[33] reported the cases of two women who after intercourse with tuberculous men developed local genital lesions. Glockner[43] has described a case of tuberculosis of the cervix due to coitus, and Verchère[104] has published similar cases. Straton[101] narrated an instance of a tuberculous growth in the vaginal wall of a previously healthy woman after marriage with a tuberculous husband. And finally Gaertner[40] inoculated the testes of rabbits and guineapigs with tubercle bacilli and found that females fecundated by these developed tuberculosis and showed lesions of the vagina and uterus.

Verneuil[105] was the first to maintain that a tuberculous individual *without* genital lesions could transmit the bacillus by coitus, and the observations of others corroborate his view. Thus Spano[98] studied microscopically and by means of cultures the sperm of a patient dead of tuberculosis and found no bacilli. This same sperm, however, when inoculated into the peritoneal cavity of a guinea-pig gave positive results two out of three times. Sirene and Pernice[96] report amost identical experiments with the same outcome. Landouzy and Martin[63] using the sperm from a living patient obtained similar findings. Foa[35] succeeded in finding the bacillus in the sperm of men dead of tuberculosis but without genital lesions, while Jani[54] in 8 cases of phthisis found the bacilli five times in the testes and four times in the prostate, but was unable to find them in the sperm. And finally the work of Derville[23] is of interest. In 8 cases of genital tuberculosis in women he found the bacilli in the secretions of 5, and in examining the husbands and lovers of these women found that all had a tuberculous epididymitis.

Among the cases in the series here reported there are a number in which it is reasonable to suppose that the infection was by coitus. Thus in the case of Montgomery[74] there was no sign of tuberculosis elsewhere and no evident source of infection other than a husband probably tuberculous. In Rieck's[87] case also no other lesion could be found, and the husband was proved to be tuberculous. In our case also coitus may have been responsible, as the husband had an active pulmonary tuberculosis, but as far as could be ascertained no genital lesion.

Secondary Vulvar Tuberculosis. Secondary vulvar tuberculosis can occur from the transmission of the bacillus either without or within the body. It is then known respectively as primary vulvar tuberculosis by auto-inoculation (primary secondary tuberculosis [Pozzi[82]]) or as secondary vulvar tuberculosis. The first group includes all cases occurring in individuals having a focus of tuberculosis in the body from the discharge of which the tubercle bacilli are transmitted locally to the vulva outside of the body. Thus tuberculous sputum or tubercle bacilli from a discharging tuberculous bone sinus might be transmitted by means of fingers, clothing, wash-cloths, etc., to the vulva. Many authors consider that the majority of reported cases should be placed in this class.

The second group includes all cases in which there is a previous focus of tuberculosis in the individual and in which the path of infection lies within the body. In this type of lesion there are four possible routes of infection.

They are:

(*a*) Hematogenous.
(*b*) Lymphatic.
(*c*) Contiguity of tissue.
(*d*) Continuity of surface.

(*a*) *Hematogenous.* Although this path of infection is generally admitted there is very little conclusive evidence in the literature showing that it occurs with any regularity. Fiocco and Levi[34] believe that it is a common way for the distribution of bacilli, particularly in cases of tuberculous enteritis. Here they consider that the bacilli reach the mesenteric lymph nodes, then the thoracic duct, and in that way the blood current, and so are distributed to the vulva as well as elsewhere. The evidence is rather scanty, and in view of the more plausible and more nearly proved modes of infection the hematogenous route can safely be discarded except in theory. The only case in our series in which this path of infection seems fairly certain is that described by Hansen[47] in a child of four years, who at autopsy showed signs of a generalized miliary tuberculosis involving also the vulva, and even here the infection might have been from the urinary tract.

(*b*) *Lymphatic.* For anatomical reasons this mode of infection must be infrequent. The lymphatics of the vulva drain into the superior internal glands of the groin, and into these same glands drain the lymphatics from the lower central portion of the abdominal wall, the region of the anus and perineum, and the median surfaces of the buttocks. These channels all freely intercommunicate, and it is conceivable that a superficial tuberculous lesion of any of these regions might travel by way of the lymphatics and so reach the vulva. Practically this mode of infection is most difficult to differentiate from infection by contiguity of tissue. Thus in Martin's[69] case there was not only a tuberculosis of the vulva but a series of ulcerative lesions on the buttocks and upper inner thighs which was thought to be lupus. This is the only case in the series in which lymphatic infection seems even possible, but there are a number of cases in which ulcers of the lower rectum or anal canal might have infected the vulva by the lymphatic channels.*

(*c*) *Contiguity of Tissue.* It is possible to include more cases in this than in either of the two preceding classes, and in studying our material some unusual possibilities have presented themselves. Direct extension of tuberculous vaginal ulcers so as to include the vulva in the ulceration is the most common form encountered. After this we find direct extension from tuberculous lesions of the rectum. Here the vulvar lesion may present itself either as an ulcer or as a fistula. It is safe to say that direct extension by contiguity of tissue is most frequently from one of these two sources. Occasionally it may take place from tuberculous lesions of the skin, as already mentioned in the case described by Martin.[69] A most unusual case, and the only one of the sort we have been able to find in literature, has been described by Dambrin and Clermont[19] in a patient eighty-eight years of age. This patient, otherwise in good health, complained of a tumor of the right vulva. It was incised and found to be a cold abscess, originating in a tubercuous osteitis of the os pubis. Lecène[64] has published reports of two cases of tuberculosis of the vulva, both by direct extension of tuberculosis of Bartholin's glands. This is a unique observation, and is only paralleled in medical literature by the report of a case of tuberculous infection of Cowper's gland, the male analogue (Hartman and Lecène[48]).

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* The question has been raised as to whether a tuberculous infection can travel by the lymphatic channels against the normal direction of lymphatic flow. In this connection a case of tuberculosis of the breast reported by Power[91] is of interest. This was in a girl, aged fifteen years, in whom there was extensive axillary involvement and relatively little breast involvement. Powers believes that the axillary glands were the seat of infection and that the breast involvement was secondary.

(*d*) *Continuity of Surface.* The infection taking place under this head is believed to be derived from tubercle bacilli in the discharge either from the urinary system, genital system above the vulva, or from the feces from cases of tuberculous enteritis, etc. Examples of all of these three types of infection can be found in this series, and it might at first be thought that the constant passage of tubercle bacilli from one of these sources would lead to a frequent vulvar involvement. The fact is, however, that this does not occur with any great frequency, as can be readily judged from the figures already quoted as to the frequency of tuberculosis of the internal genitals and also from the frequency with which tuberculosis of the kidney and bladder is seen. In the 72 cases of vulvar tuberculosis here analyzed, lesions of the internal genitals are mentioned in only 9 patients who showed tuberculosis of the uterus five times, cervix five times, tubes four times, and vagina eight times. In only 3 cases is a tuberculosis of the kidney described, and only once tuberculosis of the bladder. The intestine has been involved but four times and the rectum but five times. We believe that too much stress has been laid by previous authors on this mode of infection.

SYMPTOMS AND CLINICAL FORMS. Tuberculosis of the vulva clinically presents itself in a number of forms, some of which are more or less characteristic of the disease itself, while others are of such a nature as to rather mask the diagnosis. It has been the custom in the past to recognize three main forms of the disease. They are as follows:

(*a*) Hypertrophy with ulceration (*forme ulcereuse, forme ulcerogommeuse, chancre tuberculeuz*).

(*b*) Lupus type (*forme lupique*).

(*c*) Hypertrophy without ulceration.

In studying our collected cases it has seemed to us that this classification is either not comprehensive or is too sweeping. There are undoubted cases reported which cannot be reasonably included under any of the above headings. Some of the cases which this paper considers are but scantily described, and we shall make no attempt to place each case in its class. We would, however, venture to suggest the following classification, into the divisions of which can be readily placed any given case in which sufficient data is reported.

1. Hypertrophy with ulceration.
2. Hypertrophy without ulceration.
3. Ulceration without hypertrophy.
4. Lupus type.
5. Fistulas and abscesses.

We will presently take up in detail the local findings in each of these five types, but before doing so it will be well to consider briefly the signs and symptoms common to them all.

The general symptoms are relatively slight and in primary vulvar tuberculosis comparatively negligible. In other cases they are in direct proportion to the amount of involvement of other organs. Here we see the general symptoms which may accompany tuberculosis of any part of the body, fever, increased pulse rate, loss of weight, anemia, etc.

Locally the subjective symptoms are often very slight until the disease is fairly well advanced. Burning or smarting, pruritus, or a vulvar enlargement may be the first symptom noted. With ulceration, especially if extending into the vagina, leucorrhea may be the first symptom, or possibly a burning urination, due to the passage of urine over a raw surface. Pain is usually not marked, except possibly during coitus. Functional symptoms are lacking in the absence of involvement of the internal genitals or urinary system. We cannot agree with the statement that hypertrophy is invariably present. Our case, as well as many in the literature, totally lacked this feature. The local findings in the various forms can be best described according to types.

1. *Hypertrophy with Ulceration.* This is the most common of all forms, and into this class the majority of cases can be placed. It is a disputed point as to whether the hypertrophy precedes the ulceration, or *vice versa*, or whether they develop hand in hand, but when first seen both processes are usually already evident. The hypertrophy may include the labia majora, minora, or the prepuce of the clitoris, or any of these parts may be involved singly or in combination with others. One side or both may be hypertrophied. The increase in size varies from small areas of leukoplakia of the mucous surface of the labia minora to tumor masses larger than two fists involving all the parts. This apparent hypertrophy may be an edema or a definite hyperplasia. Possibly it starts as the former, and continuing over a period of time gradually becomes transformed into the latter. When due to an edema the

surface appears smooth, tense, and uniform. There may or may not be discoloration. The margins are ill-defined and fade gradually into surrounding healthy tissue. The consistency is soft and depressions can readily be made with pressure of the examining finger. When due to hyperplasia the surface is of a rougher appearance, in color a little darker red, more nodular, its borders more precisely defined. The consistency is firm, brawny, and pitting is slight or absent. It corresponds more to the "elephantiatische tuberculose" of the Germans. There is seldom, if ever, any tenderness. It is questionable whether there are ever seen in this type the minute "apple-jelly" tubercles of true lupus.

Associated with this hypertrophy is ulceration, which varies in extent from minute areas the size of a pin-head to losses of tissue so great that the entire vulva, perineum, and anal region may be transformed into a veritable cloaca. These ulcerations occur with great frequency on the inner surface of the labia majora and minora, but may be found elsewhere. A quite frequent site is near the urethral edge or near the clitoris. At times they are a continuation of a vaginal ulceration. As already stated they frequently result in much loss of structure, so that it is not unusual to find an entire labia minora replaced by one of these ulcers. They may be single or multiple. Probably the larger single lesions represent the fusion of previous multiple ulcerations. Their irregular, indented borders are well defined, poorly nourished, seldom excavated, usually precipitous. Commonly superficial and not of greater depth than a quarter inch, these ulcers at times extend far into the subcutaneous or submucous surfaces. We have seen them extend in this manner to the depth of an inch. The base of the ulcer is formed of unhealthy granulation tissue, which shows its poor quality not only by its grayish, edematous appearance but also by the difficulty with which it can be induced to bleed. The surfaces of the lesions are covered with a rather profuse grayish, seropurulent discharge. They are seldom tender to the touch. The inguinal lymph nodes are often enlarged, at times due to definite tuberculous infection and at times due to a suppurative adenitis from absorption of the common pyogenic bacteria from the raw surface. Induration about or beneath the ulcer is usually absent.

2. *Hypertrophy without Ulceration.* This is an exceedingly rare form of which only 7 cases have been reported. Locally the findings are much the same as those already described in the previous section, lacking, of course the ulceration. The hypertrophy in these cases is usually due to hyperplasia and not to edema. Of the 7 reported cases 2 had an associated pulmonary tuberculosis and 3 a tuberculous inguinal adenitis. All occurred in adults.

3. *Ulceration without Hypertrophy.* In this group are placed all cases in which hypertrophy is not evident either from the history or examination of the patient. Many writers believe that such a

grouping is impossible because hypertrophy is always present, but our study of the collected cases has not convinced us on this point, and we believe that in a certain proportion of the patients, especially children, this hypertrophy is not found during any stage of the disease. In seven of twelve children under the age of ten years it was absent. The local examination of cases coming under this grouping shows ulcers similar in all respects to those already described, and needs no further comment. It is possible that some of the cases should be placed under the lupus type as late ulcerating lesions.

4. *Lupus Type.* That the vulva is a rare location for the development of lupus vulgaris so commonly seen about the face is shown by the statistics of Bender,[3] who among 380 cases of lupus found the vulva involved only once. The appearance, however, about the vulva differs but little from that of lupus elsewhere, except possibly for the fact of rather more frequent and early ulceration, due no doubt to the location upon a mucous membrane and the constant presence of moisture. There are the same brownish, rather deeply situated tubercles, fading on pressure to a yellowish color, giving the "apple-jelly" appearance, and being either single or multiple, with the tendency to grouping and confluence of multiple lesions to form a single lesion which early ulcerates. In some cases, as in one reported by Combeléran, the lesion may present itself as an apparent simple leucoplakia. Practically all of these lesions develop on the inner surface of the labia. It may be the development of these lesions, undetected until well advanced which contributes the majority of cases to the group we have called "ulceration without hypertrophy." Probably in this class should also be placed the occasional case in which there is a generalized miliary tuberculosis, including the vulva.

5. *Fistulas and Abscesses.* At certain times tuberculous lesions develop in the neighborhood of the vulva, caseate or become secondarily infected, and in seeking an exit for their contents, either distend one labia into a pus socket or perforate it, leaving through it a sinus which in course of time becomes lined with tuberculous granulation tissue. It is needless to point out that these must all of necessity be secondary tuberculous vulvar lesions. Thus a tuberculous osteitis of the os pubis has pointed at the vulva, a tuberculosis of Bartholin's gland has infected it, and tuberculous rectovulvar fistulas have been described. In all these cases, no matter what the point of origin, there will be present either an abscess or a fistula. The former can be identified as tuberculous only by a recognition of the primary focus, the latter in the same way or by the nature of the granulations lining the sinus, or by the recovery of tubercle bacilli in the discharge from it.

PATHOLOGY. While it is unnecessary to describe further the gross appearance of tuberculous lesions of the vulva as they occur locally, it will be of interest to refer to the relative frequency of involvement of different portions of the vulva and to note the associated tuberculous lesions which in this series have been found in other parts of the body.

From the following brief tabulation it will be seen that the labia majora and minora are most frequently involved:

	Cases.
"Vulva"	10
Labia majora	29
Labia minora	30
Clitoris	8
Entire introitus	7
Posterior commissure	6
Anterior commissure	3
Mons Veneris	2
Edge of urethra	5
Bartholin's gland	2
Prepuce	1

The condition is more frequently unilateral than bilateral, and involvement of the labia majora and minora is the most frequent association.

Looking over our cases with a view to ascertaining what other portions of the body can be expected to show most frequently an associated tuberculosis, we obtain the statistics tabulated below. These must be judged only relatively, for their accuracy is marred not only by lack of complete reports but also by the fact that in the majority of cases the observations were clinical only, and not confirmed by autopsy record. The parts involved were as follows:

		Cases.
No associated tuberculosis mentioned or found in		31
Tuberculosis of	lungs	21
"	inguinal lymph nodes	11
"	cervical lymph nodes	2
"	axillary lymph nodes	1
General miliary tuberculosis		4
Tuberculosis of	joints	2
"	spine	2
"	os pubis	1
"	kidneys	3
"	bladder	1
"	suprarenal glands	1
"	uterus, body	5
"	uterus, cervix	5
"	tubes	4
"	vagina	8
"	peritoneum	3
"	intestine	4
"	rectum	5
"	meninges	1
"	skin (lupus vulgaris)	1

It is thus seen that an associated pulmonary lesion is most frequently found and next in order a tuberculous lesion of some higher portion of the genital tract.

In describing the microscopic picture we can conveniently divide the lesions into two types, deep and superficial. To the former belong the four following clinical groups: hypertrophy with ulceration, hypertrophy without ulceration, ulceration without hypertrophy, fistulas and abscesses. To the latter belongs the lupus group. In the former the lesions are deep and involve not only the epidermis and derma or the mucosa and tissue immediately beneath it, as the case may be, but also the subcutaneous or submucous tissue. In the latter the superficial structures only are involved.

In the deep form the variation from the normal is as follows: The epithelium is at times perfectly normal and without noticeable alteration except, of course, where there is loss of surface. At times it is thickened and cornified. There is sometimes, but not always, seen in the derma an infiltration of plasma cells clustered together in masses in the centres of which may or may not be found giant cells. The lesions are especially marked and at times only seen in the subcutaneous or submucous tissue. This infiltration may be diffuse and lacking in giant-cell formation, due, as Unna[102] has shown, to lack of pressure and the elasticity of the parts involved. The white and elastic fibers are increased in size and swollen with a clear fluid. They present the appearance of a chronic edema. Many dilated bloodvessels and lymphatic spaces are seen. In the centres of and about the giant cells and diffusely scattered in the areas of diffuse plasma-cell infiltration tubercle bacilli can be found.

As they progress these lesions reach the surface and ulceration ensues. This process may take place only in parts of the lesion, usually the centre. The extent of the diseased area cannot therefore be judged alone by the extent of the ulceration. In some cases, as in the one described by Bender and Nandrot,[5] we find lesions on the point of involving the epidermis or mucous membrane, but the latter still preserved. Such findings substantiate the view held by some writers that the hypertrophic form of tuberculosis of the vulva represents delayed ulceration and is in reality the preulcerative stage of hypertrophy with ulceration. This delay in ulceration may possibly be due to the thickening and cornification of the epidermis which is more marked in the pure hypertrophic form than in the type with ulceration, where it is practically wholly lacking.

In the superficial form (lupus type) the lesions are confined to the surface layers and do not differ from the well-known picture of lupus as seen on the more common locations. They need not here be described other than to again emphasize the fact that the subcutaneous tissue is not involved.

DIFFERENTIAL DIAGNOSIS. The lesions which simulate tuberculosis of the vulva may be either acute or chronic.

Among the acute non-tuberculous lesions which may show ulcerations are gonorrheal vulvovaginitis, anogenital diphtheria, the ulcerations occasionally seen in the acute exanthemata, gangrene of the vulva in the eruptive fevers, acute Bartholinitis, and acute phagedenic and round ulcers (Vautrin[103]). In all of these the acuteness of onset, the presence of other local or general phenomena, and the bacteriological examination of the secretions are of essential diagnostic importance and need only be mentioned.

Greater difficulty in diagnosis will be encountered among the subacute and chronic lesions, as is shown by the use of the word "esthiomene." This term has been used to describe a chronic vulvar ulceration with or without hypertrophy, in the production of which a chronic lymph stasis plays an important role. Various lesions which should have received more accurate diagnoses have been described under this term. We agree with Bonnin,[9] who condemns the use of the word, and with Combeléran,[17] who points out that many cases described as "esthiomene" are true cases of tuberculosis of the vulva. Biopsy only will prove this point.

Syphilis of the vulva is encountered in a number of forms. The initial chancre is of more acute onset, the surrounding edema is of greater extent, the induration of the base more marked, the ulceration not so deep, the borders less excavated, and the granulations of a brighter red, than seen in tuberculosis. There is greater enlargement of the inguinal lymph glands than in tuberculosis. Microscopic examination of smears from the ulcer base will show the Treponema pallidum. In the mixed chancre the inflammatiory character of the lesion will be even more marked, and the bacillus of Ducrey will also be found. Syphilitic mucous patches of the inner surfaces of the labia can be differentiated from a tuberculous leucoplakia only by a search for the Treponema pallidum. *Late secondary* and *tertiary* syphilitic lesions of the vulva usually ulcerate and closely simulate tuberculosis. The ulcerations are, however, more acutely inflammatory and their granulations brighter. Microscopic examination of smears serve to differentiate them. Papulohypertrophic lesions of syphilis occasionally are confused with the hypertrophic form of tuberculosis. But in syphilis, fissures are usually present and the papillomatous character of the lesion is more marked. In all the various manifestations of syphilis about the vulva (except the early chancre) the presence of a positive Wassermann reaction establishes the diagnosis. Other evidences of the disease may be present. Rapid healing under specific treatment proves the luetic nature.

Simple chancre (chancroid) is frequently seen about the vulva. Here the acute onset, the greater pain and inflammation, the tendency for development of new lesions on coapted surfaces, the frequency of suppurative inguinal adenitis, and the microscopic finding of the bacillus of Ducrey should differentiate it from tuberculosis.

In *epithelioma of the vulva* the raised edges and hard nodular borders should identify the character of the lesion. They are not seen in tuberculosis. (Biopsy is conclusive.)

Sarcoma of the vulva is an exceedingly rare lesion, hard, firm, not ulcerating until a late stage, when metastatic lesions are already evident. In its early stages it is distinguished from the hypertrophic form of tuberculosis by its local character, involving one portion only of the vulva.

In *kraurosis vulvæ* the lesions are generalized and the skin and mucous membranes are grayish. Atrophy takes place to so great an extent that the labia majora and minora are much distorted and may be fused. This atrophy is not seen in tuberculosis.

Various *miscellaneous lesions* which may simulate tuberculosis have been mentioned in literature. None of them are of great importance and few of them should give rise to difficulty in diagnosis. Bonnin[9] refers to actinomycosis and molluscum contagiosum, both of which can be recognized microscopically. Combelèran[17] speaks of acne, furuncles, suppurative vulvar folliculitis, and herpes of the vulva. Froelich[33] has described a diabetic vulvar ulcer.

It is thus seen that there are many conditions from which tuberculosis of the vulva must be differentiated. In most of them a clinical diagnosis is possible, but the ultimate diagnosis must rest upon microscopic examination either of smears or of biopsy specimens.

PROGNOSIS. We have reviewed the cases here collected to study the results of treatments used and to determine the prognosis. This latter is not good. In 23 cases the data as to immediate or late result is too meager for use in our study. In 49 cases such data is partially or wholly given. Of these 49 cases, 21 or nearly 43 per cent. died, while 28, or about 47 per cent., recovered. One case was reported well locally seven years after treatment, but when last seen had a steadily progressive pulmonary tuberculosis. Of the other cases reported "recovered" many were lost sight of shortly after treatment and some few have had recurrences. The true end-result was given in so few cases that the prognosis is probably even worse than the above figures indicate. An associated tuberculosis was found elsewhere in the body in all cases which died. There were two operative deaths recorded. One occurred from shock following a panhysterectomy for an associated tuberculosis of the body and cervix of the uterus; the cause of death in the second case was not given. Prognosis is no more favorable in one type of the disease than in another. The lupic type is considered by some writers more benign.

Table II shows briefly the results in this series of various forms of treatment. "Healed" and "recurrence" refer to the local condition for various intervals of time during which each case has been under observation. "Healed" cannot therefore be interpreted as an end-result, although for any individual case it may be such.

TABLE II.

	No. of cases.	Healed.	Recurrence.	Per cent. healed.
Excision	20	13	7	65
Curette and cautery	6	5	1	83
Excision with cautery	1	0	1	0
Cautery	1	1	0	100
Nitric acid	1	1	0	100
Iodoform	2	2	0	100
Tuberculin	1	1	0	100
General hygiene	1	1	0	100

TREATMENT. While the form of local treatment must vary with the individual case, the necessity of careful general management of the patient, rather than the disease, must not be lost sight of. It is unnecessary for us to here enter upon a discussion of the general treatment of tuberculosis. To suitable changes in diet, environment, and mode of life can be added, we believe with advantage, tuberculin. The details of technique, selection of patient and preparation, and dosage must be governed by those same rules which have given such excellent results in surgical tuberculosis elsewhere in the body. General miliary or active pulmonary tuberculosis contra-indicate the use of tuberculin.

The local treatment may be palliative or radical. Reference to Table II shows the results in this series of the different forms of treatment. Palliative measures vary in severity from the use of simple dusting powders or ointments to cauterization by mineral acids or heat. The value of local antiseptics is questionable and empirical. Iodoform, which is most frequently used, can be taken as an example. Fränkel[37] has shown that bacteriologically it is not antiseptic, and that after sterilization at high temperatures the iodin is driven off. Its chief value seems to be in its fibroplastic power. Because of this it may be useful in the treatment of localized tuberculosis. Fränkel,[37] however, prefers pure sterile bone carbon for this purpose. The pathology of the disease proves the uselessness of local applications which do not destroy. They cannot penetrate to the necessary depth.

The various caustics are also insufficient because of their lack of depth of action. Silver nitrate is worthless. The action of lactic and the mineral acids cannot be controlled. Thermal cauterization should be classed among radical measures.

Radical local measures include curettage, cauterization by heat, excision of the lesion with the thermocautery, and dissection excision. While each of these methods of treatment has its advocates it is difficult to decide among them.

Remembering that tubercles may be found at some distance from the apparent edge of the lesion, we can mention curettage only to condemn it. The procedure should never be used. It is more apt to spread than to cure the lesion.

Theoretically, dissection excision should give the best results, provided, of course, that the dissection can be carried on entirely in healthy tissue. This is often difficult. The depth of the lesions is at times considerable and the anatomical arrangement of the parts makes a wide excision often impossible without serious mutilation of surrounding structures. It is this limited operative field which has been responsible for the dissection in so many cases passing through active infective tuberculous material. That such material has been entered is shown by the local recurrence and the frequency with which an operative interference has been followed by a diffuse general miliary tuberculosis. Operation upon tuberculosis of this region of the body (perineum) seems particularly prone to disseminate the disease. This may be due to the close proximity and almost invariable simultaneous involvement of mucous membrane in the tuberculous process. Elting[31] has reported 9 cases of tuberculous fistula in ano, 4 of whom died subsequent to operation from a progression of their pulmonary tuberculosis. Similar untoward results are at times seen in tuberculosis of other mucous membranes. Thus Shepherd[94] has reported a case of tuberculosis of the tongue which after removal developed an acute general miliary tuberculosis rapidly terminating in death. Quénu and Hartman,[83] however, prefer dissection excision to cautery excision in tuberculosis about the perineum.*

Thermocauterization if carried sufficiently deeply should not only eradicate the lesion, but also seal off the lymphatics so that dissemination cannot occur. Its use is, however, limited by the proximity of surrounding important structures. Superficial cauterization is valueless. Only deep and thorough cauterization is sufficient. This will, unfortunately, leave a large area to heal by granulation.

Excision with the cautery knife seems to be the method of choice, even though destruction of tissue be large. By this method the exact limit of the areas to be excised can be determined and adhered to. Less destruction of contiguous parts will take place with a thin cautery blade than with a blunt cautery point.

If inguinal lymph glands are evidently infected, they should be removed. Dissection *en bloc*, as for an epithelioma of the vulva, is unnecessary. In the absence of evident involvement the lymph glands need not be removed. This is in accordance with the current view of the analogous problem in tuberculosis of the mammary gland.

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* It is never certain that any operative procedure on an apparently local tuberculous focus will not activate some other known or unknown tuberculous lesion in the body. This is not only true of tuberculosis involving mucous membranes as above mentioned but also of other parts of the body. Powers[81] has reported a case of tuberculosis of the breast which after operation died of a pulmonary tuberculosis. Hill[53] and others have reported similar results in dealing with tuberculous kidneys, etc., and the list might be indefinitely multiplied.

BIBLIOGRAPHY.

1. Audry and Combeléran. Soc. franc. de dermat. et de syphil., 1906, xvii, 86.
2. Babes. Bull. soc. anat. de Paris, 1883, 4. s., viii, 341.
3. Bender. Archiv. f. dermat., 1886, xiii, 703.
4. Bender. Rev. de gynéc. et de chir. abd., 1906, x, 867.
5. Bender and Nandrot. Bull. et Mém. soc. anat. de Paris, 1904, lxxix, 129.
6. Berkeley. Jour. Obstet. and Gyn. British Empire, 1903, iii, 31.
7. Bernutz. Arch. de Tocologie, 1874, i, 394.
8. Beyea. Amer. Jour. Med. Sci., 1901, cxxii, 612.
9. Bonnin. Thesis of Paris, 1904–1905.
10. Boursier. Jour. de méd. de Bordeaux, 1908, xxxviii, 693.
11. Brault. Gaz. des. hôp., Paris, 1912, lxxxv, 333.
12. Brosin. Monatsschr. f. Geb. u. Gyn., 1899, x, 852.
13. Cayla. Progress. Méd., 1881, ix, 648.
14. Cohnheim. Tuberculose von standpunte der Infectionslehre, Leipzig, 1879.
15. Chiarabba. Giorn. di ginecol. e di pediat., 1904, xxii, 341.
16. Chiari. Vierteljahrsschrift f. Derm. u. Syph., 1886, xiii, 341.
17. Combeléran. Thesis of Paris, 1906.
18. Cornil and Rigal. Soc. med. des hôp., 1879, 2. s., xvi, 100.
19. Dambrin and Clermont. Toulouse méd., 1906, n. s., viii, 218.
20. Daniel. Monatsschr. f. Geb. u. Gynäk., 1913, xxxvii, 65.
21. Daniel and Jianu. Revista de Chir., Bucaresti, 1907, p. 489.
22. Danlos, Pathaut, and Gaston, Ann. de dermat. and de syph., Paris, 1906, vii, 675.
23. Daurios. Rev. méd.-chir. des mal. des femmes, 1890, xii, 82; 144; 213.
24. Davidsohn. Berl. klin. Woch., 1889, xxxvi, 547.
25. DeFontaine. Quoted by Deschamps.
26. Demme. Wiener med. Blätter, 1887, x, 1546; 1576.
27. DePaoli. Quoted by Secchi.
28. Derville. Thesis of Paris, 1887.
29. Deschamps. Archiv. de Toxicologie, 1885, xii, 19; 120; 221.
30. Ehrmann. Wien. med. Presse, 1901, xxxxii, 202.
31. Elting. Ann. Surg., 1912, lvii, 744.
32. Emanuel. Zeitschr. f. Geb. u. Gyn., 1894, xxix, 135.
33. Fernet. Soc. méd. des hôp. de Paris, 1884, 3. s., i, 420.
34. Fiocco and Levi. Giorn. ital. della mal. ven. e della pelle, 1899, xxxiv, 649.
35. Foa. Acad. di Med. di Torino, 1892, xl, 167.
36. Forgue and Massabuau. Rev. de chir., Paris, 1909, xxxix, 1029.
37. Fränkel. Wien. klin. Woch., 1900.
38. Frattali. Ann. de dermat. et de syph., 1904, 4. s., v, 843.
39. Froelich. Rev. méd. de l'est, Nancy, 1905, xxxvii, 221.
40. Gärtner. Zeitschr. f. Hygiene u. Infect., 1803, xiii, 101.
41. Gebhard. Pathologische Anatomie der Weiblichen Sexualorgane, Leipzig, 1899, p. 579.
42. Geil. Dissertation Erlangen, 1851.
43. Glockner. Beitr. z. Gyn. u. Geb., 1901, v, 413.
44. Gorowitz. Thesis of Paris, 1900.
45. Haeberlin. Arch. f. Gyn., 1890, xxxvii, 16.
46. Hamburger. La semaine méd., 1906, xxvi, 46.
47. Hansen. Bibl. f. Laeger, 1899, x, 666.
48. Hartmann and Lecène. Travaux de chirurgie anatomo-clinique, 1903, 1. s., 118.
49. Havas. Monatsschr. f. Geb. u. Gyn., 1898, viii, 690.
50. Hegar. Die Entstehung, Diagnose und chirurgische Behandlung der Genital tuberculose des Weibes., Stuttgart, 1886.
51. Hintze. Centralbl. f. Gynäk., 1896, xx, 1194.
52. Huguier. Compt. rend. de l'Acad. de méd., 1849.
53. Ill. Ann. Surg., 1903, xxxviii, 524.
54. Jani. Virchows Archiv, 1886, cii, 522.
55. Joest. Vet. Jour., London, 1911, lxvii, 112.
56. Jorfida. Ann. de gyn. et d'obstet., 1901, lv, 138.
57. Karajan. Wien. klin. Woch., 1897, x, 921.

58. Kelly. Operative Gynecology, 1909, i, 266.
59. Koch. Berl. klin. Woch., 1882, p. 221.
60. Kroemer. Charité Ann., Berl., 1910, xxxiv, 553.
61. Kuttner. Beiträge zur klin. Chir., 1896, xvii, 533.
62. Lagane. Bull. et mém. soc. anat. de Paris, 1910, lxxxv, 665.
63. Landouzy and Martin. Rev. de méd., Paris, 1883, iii, 1014.
64. Lecène. Ann. de gynéc. et. d'obstet., Paris, 1909, 2. s., vi, 77.
65. Logothetopoulos. Arch. f. Gynäk., 1906, lxxix, 316.
66. MacDonald. Edinburgh Med. Jour., 1884, xxix, 909.
67. Mandach. Correspondenzbl. f. Schweizer Aerzte, 1884, xiv, 57.
68. Martin. La Normandie méd., 1895, x, 33.
69. Martin. Rev. méd. de Normandie, 1901, ii, 493.
70. Martin. Berl. klin. Woch., 1908, xlv, 89.
71. Martineau. Quoted by Combeléran.
72. Mauler. Beitr. zur Geb. u. Gynäk., Leipzig, 1910–1911, xvi, 485.
73. Meriel. Ann. de gyn. et d'obstet., Paris, 1907, 2. s., iv, 736.
74. Montgomery. International Clinics, 1895, iii, 280.
75. Morgagni. De Sedibus et Causis Morborum, 1871, Epistola 38, No. 34.
76. Mosler. Dissertation Breslau, 1883.
77. Murphy. Amer. Jour. Obst., 1903, xxxxviii, 737.
78. Petit and Bender. Rev. de gynéc. et de chir. abd., 1903, vii, 947.
79. Poeverlein. Inaug. Dissertation Munich, 1902.
80. Popoff. Thesis of St. Petersburg, 1898.
81. Powers. Ann. Surg., 1913, lvii, 171.
82. Pozzi. Traité de Gynécologie, 4th edition, 1907.
83. Quénu and Hartmann. Chirurgie du Rectum, Paris, 1895, p. 125.
84. Raynaud. Archiv. gen. de méd., 1831, xxvi, 486.
85. Rechenbach. Inaug. Dissertation Halle, 1901.
86. Renaud. Rev. méd. de la Suisse romande, 1904, xxiv, 297.
87. Rieck. Monatsschr. f. Geb. u. Gyn., 1899, ix, 842.
88. Rossle. Verhandl. der deutsch. Gesellsch. f. Gynäk., 1911, xiv, 441.
89. Schenk. Beiträge zur klin. Chir., 1896, xvii, 526.
90. Schiler. Ueber die Resultate der palliativen und operativen Behandlung der Genitaltuberculose beim Weibe, Freib., 1903, K. Henn, 48 p. 8°.
91. Schlimpert. Arch. f. Gynäk., Berlin, 1911, xvi, 863.
92. Secchi. Giornal Italiano del malattie ven. e della pelle, 1901, xxxvi, 546.
93. Senn. Tuberculosis of the Genito-urinary Organs, Male and Female, 8°, Philadelphia, 1897.
94. Shepherd. Ann. Surg., 1888, viii, 368.
95. Simmonds. Arch. f. Gynäk., 1909, lxxxviii, 29.
96. Sirena and Pernice. Gaz. degli Ospedali, 1887 (quoted from Bonnin, original not found).
97. Spaeth. Dissertation Strasbourg, 1885.
98. Spano. Revue de la Tuberculose, 1893, p. 322.
99. Stoeckel. Monatsschr. f. Geb. u. Gynäk., 1910, xxxii, 371.
100. Stoica. Thesis of Bucarest, 1907.
101. Straton. British Med. Jour., 1903, ii, 968.
102. Unna. Histopathology of Diseases of the Skin, English translation by Walker, Edinburgh, 1896, p. 579.
103. Vautrin. Rev. méd. de l'est, Nancy, 1905, xxxvii, 220.
104. Verchère. Thesis of Paris, 1884.
105. Verneuil. Gaz. hebd. de méd. et de chir., Paris, 1883, xx, 225.
106. Viatte. Archiv. f. Gynäk., 1891, xl, 474.
107. Weinlechner. Sitzungsberichte der geb.-gynäk. Gesellschaft, Wien, 1889, ii, 9.
108. Williams. Johns Hopkins Hosp. Rep., 1894, iii, 85.
109. Winckel. Pathologie der Weiblichen Sexualorgane, Leipzig, 1881, p. 268.
110. Winter. Lehrbuch der gynäkologischen Diagnostik, Leipzig, 1896, p. 360.
111. Wolff. Deut. med. Woch., 1907, xxxiii, 780.
112. Zweigbaum. Centralbl. f. Gynäk., 1888, 494.